

3.1 Air Quality (Greenhouse Gases)

3.1.1 Existing Conditions

Currently, there are no international, national, state, or local regulatory limits on greenhouse gas emissions. Regardless, SE2's original ASC (1999) acknowledged that greenhouse gas emissions from the S2GF could pose an environmental concern. SE2 originally proposed a greenhouse gas mitigation plan that specified a series of annual payments totaling \$1 million for qualified third parties to fund regional and worldwide offset projects (Sumas Energy 2, Inc. 1999).

As part of its previous Findings of Fact, Conclusions of Law, and Order Recommending Denial of Site Certification (February 2001), EFSEC concluded that SE2's originally proposed greenhouse gas mitigation plan failed to satisfy EFSEC's obligations to avoid or mitigate adverse environmental impacts. In the Second Revised ASC (2001), SE2 revised its proposal for greenhouse gas mitigation to include the measures described below.

3.1.1.1 Regulatory Framework

There are currently no regulations on greenhouse gas emissions specified by international, federal, state, or local rules. The U.S. signed the internationally negotiated Kyoto Protocol in 1999, agreeing with the other signatory nations on the overall objectives of the Protocol and agreeing with its specified emission reductions. The Protocol would commit the developed nations of the world to reduce their greenhouse gas emissions by an average of about 30 to 40 percent by the year 2012.

Although all of the signatory nations agreed to the overall objectives of the Protocol, this does not mean that it has become international law. The Protocol would be enacted and would obtain international law status only if at least 55 nations responsible for at least 55 percent of global greenhouse gas emissions ratify individual treaties to specify emission tracking and international enforcement. President Bush has indicated he will not sign a ratification treaty for the Kyoto Protocol. However, the Protocol would become international law even without U.S. ratification if a sufficient number of the remaining nations ratified their own treaties.

3.1.1.2 Recent Global Warming Research

The issue of how emissions from human activities might affect global climate has been the subject of extensive international research over the past several decades. There is disagreement between atmospheric scientists regarding the likelihood and magnitude of the potential global climate change. Two sets of key research documents have recently been published.

The United Nations Intergovernmental Panel on Climate Change (IPCC) published its most recent set of 5-year progress reports summarizing worldwide research on global warming (IPCC 2001a, IPCC 2001b). These reports indicated that some level of global warming related to human activity is likely to occur and that there is a significant possibility of severe environmental impacts.

President Bush requested the National Academy of Sciences to provide a brief comprehensive review of the IPCC reports (National Academy of Sciences 2001). The review panel included atmospheric scientists with a range of opinions on future global warming. The National Academy of Sciences review was written in lay terms and focused on addressing several fundamental issues. The panel concurred with most of the findings by the IPCC.

3.1.1.3 *Comparison of Local Versus Worldwide Greenhouse Gas Emissions*

Table 3.1-1 lists greenhouse gas emissions worldwide, and from the United States, the State of Washington, and the proposed S2GF project. The table also lists the total estimated future greenhouse gas emissions from the new gas-fired power plants forecasted to be built in the Pacific Northwest (BPA 2001). There are many air pollutants that comprise “greenhouse gases,” each of which exhibits a different chemical tendency to affect global warming. Therefore, emissions of various greenhouse gas chemicals are commonly standardized as “carbon equivalents.” The emission rates listed in Table 3.1-1 are standardized as million metric tons of carbon equivalents (MMTCE) per year. For comparison, 1 million tons of CO₂ is equal to 0.25 MMTCE. As listed in the table, most of the greenhouse gas emissions are in the form of CO₂, while a smaller fraction of the emissions are in the form of other gases such as methane or nitrous oxide.

3.1.2 Environmental Impacts of Proposed Project

By itself, the S2GF project would emit an estimated 2.4 million tons per year of CO₂ (or 0.6 MMTCE). This is 2 percent of the amount of CO₂ presently emitted from all sources in Washington State and 6 percent of the amount anticipated to be issued from all proposed power plants in the Northwest. The actual effect on global warming of 2.4 million tons per year of CO₂ is unknown.

Table 3.1-1. Comparison of Worldwide vs. Local Greenhouse Gas Emissions

Item	Annual Greenhouse Gas Emissions (MMTCE per year)		
	CO ₂	Compounds Other than CO ₂	Total
Worldwide emissions (including, U.S.) (1998)	5,660	2,430	8,090
United States emissions (1998)	1,494	340	1,834
Washington State emissions (1995)	21	4	25
Anticipated future gas-fired power plants in Washington and Oregon (28 plants, 11,000 MW)	11	No data available	11
Proposed S2GF emissions	0.6	0.006	0.606
MMTCE – million metric tons of carbon equivalent			
Sources: IPCC 2001; EPA 2000; CTED 1999; BPA 2001.			

3.1.3 Mitigation Measures

3.1.3.1 Proposed (Revised) SE2 Greenhouse Gas Mitigation Plan

SE2 proposes to offset a portion of its greenhouse gas emissions from the S2GF facility according to a “monetary path” offset payment program established by the Oregon Energy Facility Siting Council, as specified by the Oregon Administrative Rules (OAR) Chapter 345, Part 24. The S2GF is not subject to Oregon regulations, but SE2 would enter into binding agreements with EFSEC to make the required payments to the Oregon Climate Trust.

The Oregon rule establishes a CO₂ emission standard of 0.675 pound of CO₂ per kilowatt-hour (lb/kWh) of electricity produced for base-load natural gas-fired electric utility plants. The emission standard is equivalent to 17 percent less than the most efficient plant operating in the United States. All CO₂ emissions from a proposed new power plant that exceed the CO₂ emission standard must be offset by a combination of the following methods:

- The proposed new plant can use cogeneration to reduce its overall CO₂ emissions.
- The proposed plant can develop its own CO₂ offsets, and then provide demonstrations to certify the actual CO₂ reductions.

- The proposed plant can enter into the “monetary path” offset agreement with Oregon.

SE2 proposes to participate in the “monetary path” program. The steps to satisfy the offset requirement under that program are as follows:

- The facility pays emission fees to a qualified third party organization responsible for developing regional programs to offset, replace, or sequester CO₂ emissions. The Climate Trust is currently the only organization designated as a “qualified party” by the State of Oregon.
- The facility must pay emission fees for all CO₂ emissions exceeding the emission standard (0.675 lb/kWh for base-load plants). For base-load plants, the facility must pay a one-time, lump sum fee for all excess emissions assuming 30 years of continuous operation at 100 percent load. There is no provision to rebate the facility if the plant operates at less than 100 percent load. There is no requirement for the facility to pay additional fees if the plant operates longer than 30 years.
- The emission fees are based on the actual CO₂ emission rates that are measured by one-time stack tests conducted within 1 year after facility startup. There is no provision to adjust the fees if the actual efficiency of the plant decreases during the 30 years of operation.

The current emission fee is \$0.57 per ton of CO₂, plus roughly 5 percent administrative and contracting costs. Under the Oregon program, the legislature may approve increases in the emission fee based on documentation of the actual costs of CO₂ offsets. The Oregon Energy Facility Siting Council has proposed an increase in the emission fee from the current \$0.57 per ton up to \$0.855 per ton, which is expected to be approved before the end of 2001 (Ashford 2001). No assumption has been made regarding its passage or what fee might be selected.

Under the monetary path system, the facility pays a lump sum for 30 years of emissions based on the emission fee in place when Oregon approves the facility’s certification. There is no provision to adjust future payments if the unit cost for CO₂ offset increases during the 30-year period either by simple inflation or by changes in the long-term availability of offset projects.

Facilities in Oregon regulated by the rule must pay the lump-sum fee immediately upon certification, rather than upon plant startup. However, SE2’s proposed mitigation specifies that the combined fees for 30 years of plant operation will be paid in five equal annual installments, totaling the amount that would have been paid as the lump sum, with no provisions for SE2’s cost savings by discounting the delayed payment.

3.1.3.2 Environmental Benefits of Proposed Greenhouse Gas Mitigation

The environmental impact assessment related to greenhouse gas emissions from the S2GF includes consideration of the following issues because it is based on the Oregon plan:

- The estimated CO₂ emissions from the S2GF and how they compare to Oregon's CO₂ emission standard
- The amount of money SE2 would provide to the Climate Trust based on the financial requirements under the Oregon rule
- The fraction of the S2GF's CO₂ emissions that could be offset using the funds SE2 would pay to the Climate Trust

These data are presented in Table 3.1-2 and are addressed below.

CO₂ Emission Rate

SE2 reports its estimated CO₂ emission rate would be 0.837 lb CO₂ per kWh of electricity production, with a full-load annual electricity production of 5.78×10^9 kWh per year. Based on those assumed full-load conditions, the potential maximum CO₂ emissions from the S2GF would be 2.42 million tons per year. SE2 previously reported that its anticipated actual load factors over 30 years of plant operation would be 85 percent capacity and 97 percent load (Sumas Energy 2, Inc. 1999), so actual CO₂ emissions would be lower than this.

Emissions Exceeding Oregon Emission Standard

SE2 would pay emission fees on an estimated 470,000 tons per year of CO₂, based on full-load conditions. This estimate of the excess emissions is based on SE2's estimate of the plant's CO₂ emission rate. The actual emission fee basis would be determined from stack tests conducted upon startup.

Payment to Climate Trust

Based on an emission fee of \$0.57 per ton, SE2 would pay 5 equal annual installments totaling \$8.44 million.

S2GF Emissions Offset

Under current conditions, the analysis presented in this SEIS is based on an elimination unit cost of \$2 per ton of CO₂. Therefore, SE2's fee payment to the Climate Trust would pay for eliminating 4.2 million tons of CO₂ over a 30-year period. That elimination is equivalent to 6 percent of the CO₂ emissions from the facility.

As costs of CO₂ elimination grow, with SE2 contributing the same amount of money per year, the fraction of CO₂ eliminated would be reduced to less than 6 percent and would continue to decrease as costs rise.

Table 3.1-2. Estimated CO₂ Offset Funds to Oregon Climate Trust

Item	Value
CO₂ Offsets Exceeding Oregon Emission Standard	
Estimated CO ₂ emission factor for S2GF	0.837 lb CO ₂ /kWh
Potential annual electricity production at 100 percent capacity	5.78 x 10 ⁹ kWh/yr
Potential annual CO ₂ emissions at 100 percent capacity (0.837 lb/kWh * 5.78 x 10 ⁹ kWh/yr / 2,000 lb/ton)	2.42 million tons CO ₂ /yr
Oregon CO ₂ emission standard for base-load plants	0.675 lb/kWh
S2GF CO ₂ emissions satisfying Oregon standard at 100 percent capacity (0.675 lb/kWh * 5.78 x 10 ⁹ kWh/yr / 2,000 lb/ton)	1.95 million tons CO ₂ /yr
CO ₂ emissions subject to Oregon emission fee = difference between potential CO ₂ emissions and Oregon standard (2.42 million tons/yr – 1.95 million tons/yr)	470,000 tons CO ₂ /yr
Estimated Emission Fee Payment to Climate Trust	
Assumed future unit fee at time of contract negotiation by SE2	\$0.57/ton CO ₂
Estimated 30-year payment to Climate Trust (470,000 tons/yr * \$0.57/ton * 30 yr)	\$8.04 million
Estimated Climate Trust contracting and selection payment	\$400,000
Estimated total payment to Climate Trust	\$8.44 million
Actual CO₂ Elimination Achievable by Fee Payment	
SE2 payment to Climate Trust	\$8.44 million
Assumed actual unit cost for CO ₂ elimination	\$2/ton
Estimated amount of CO ₂ actually eliminated by fees paid to Climate Trust (\$8.44 million / \$2/ton)	4.2 million tons of CO ₂
Fraction of S2GF CO ₂ emissions actually eliminated (4.2 million tons / [2.42 million tons/yr * 30 yr])	6 percent

Actual Cost of Greenhouse Gas Elimination

The Climate Trust, however, understands that the current emission fee of \$0.57 per ton of CO₂ paid for each ton of CO₂ is less than the actual cost to eliminate a ton of CO₂ (Burnett 2001). The Climate Trust's actual elimination costs based on its first round of offset projects averaged \$1.50 per ton (Nelson 2001). Seattle City Light is currently working with the Climate Trust to find CO₂ elimination projects to offset its purchase of electricity from the new gas-fired power plant near Klamath Falls, Oregon. City Light's actual negotiated costs for its most recent round of contracts averaged \$2 per ton of CO₂, and it has allocated funds to cover future costs at \$5 per ton of CO₂ over the next 5 years (Howell 2001). City Light has estimated that the actual costs for the upcoming round of contracts will be roughly \$4 per ton of CO₂. However, under current conditions, the analysis presented in this SEIS is based on an elimination unit cost of \$2 per ton of CO₂.

3.1.3.3 Mitigation Offset Goal

If there is a goal to meet a certain percentage of offset, EFSEC could require that the applicant commit to that goal and commit to an annual contribution which would cover the costs of such offsets.